REMARKS

The Office Action mailed November 13, 2008 and made final has been carefully reviewed and the following remarks have been made in consequence thereof.

Claims 1, 3-15, and 17-29 are now pending in this application. Claims 1, 3-15, 17-29 stand rejected. Claims 2, 16, 30, and 31 have been canceled.

The rejection of Claims 1, 5-9, 12-15, 19-23, 28, and 29 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,347,265 to Bidaud (hereinafter referred to as "Bidaud") in view of U.S. Patent No. 6,211,821 to Ford (hereinafter referred to as "Ford") and in further view of U.S. Patent No. 6,218,961 to Gross (hereinafter referred to as "Gross") is respectfully traversed.

MPEP § 706.02(l)(2) states:

> [i]n order to be disqualified as prior art under 35 U.S.C. 103(c), the subject matter which would otherwise be prior art to the claimed invention and the claimed invention must be commonly owned, or subject to an obligation of assignment to a same person, at the time the claimed invention was made or be subject to a joint research agreement at the time the invention was made.

The Examiner relies on Gross as a basis for rejecting Claims 1, 5-9, 12-15, 19-23, 28, and 29 under 35 U.S.C. § 103(a). However, for at least the reasons discussed below, Gross is unavailable as a prior art reference to reject Claims 1, 5-9, 12-15, 19-23, 28, and 29 under Section 103. Specifically, Gross is only available as prior art under 35 U.S.C § 102(e). More specifically, the present application was filed June 1, 2000. Because the June 1, 2000 filing date of the present application is after Gross's February 20, 1998 filing date and prior to Gross's April 17, 2001 publication date, Gross is only available as prior art under 102(e).

The claimed subject matter in both the present application and Gross was, at the time of invention of the claimed subject matter of the present application, commonly owned by General Electric Harris Railway Electronics, LLC., Melbourne, Florida, (hereinafter "G.E.") and/or subject to an obligation of assignment to G.E. Common ownership of both the present application and Gross is evidenced by, for example, a recordation of an Assignment of Application No. 09/585,192, the present application, to GE at Reel/Frame 010855/0176, and

a recordation of an Assignment of Patent No. 6,218,961, Gross, to G.E. at Reel/Frame 009371/0139. Because Gross and the claimed subject matter of the present application were "commonly owned, or subject to an obligation of assignment to a same person, at the time the claimed invention was made," Gross is excluded as prior art under 103(c). As such, Gross is only available as prior art under Section 102(e), and not under Section 103(a).

Furthermore, neither Bidaud nor Ford, considered alone or in combination, describes or suggests, a method for determining motion and location parameters of a railroad locomotive as is recited in Claim 1.

Bidaud describes a track analyzer that is coupled to a vehicle (28) traveling on a track (10). The analyzer includes a vertical gyroscope (20) for determining a grade and an elevation of the track. A rate gyroscope (50) determines a curvature of the track, and a speed determiner (70) determines a speed of the vehicle relative to the track. A distance determiner (91) determines a distance the vehicle has traveled along the track. The vehicle's heading is found by determining whether the phase of a first plate (112) leads/lags the phase of a second plate (114). Notably, Bidaud does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude.

Ford describes a navigation system (10) that uses satellite positional signals to determine pitch, azimuth and position of a vehicle. The navigation system (10) includes an integration unit (20) that receives a data (15) from a magnetic sensor (30) and data (17) from a heading sensor (40). The magnetic sensor is preferably a magnetic compass. The heading sensor (40) is preferably a single-axis attitude sensor that is used to acquire a positioning signal (13) from a satellite (11), such as a Global Positioning System (GPS) satellite. During periods when the satellite signal (13) is poor or unavailable, the intergation unit (20) continues to provide an azimuth output (19) via a built-in redundancy feature wherein data (17) from the heading sensor (40) is used to correct data (15) from the magnetic sensor and the corrected data is used to ensure the integrity of the azimuth output (19). Notably, Ford does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a

database that provides an initial heading and track grade as a function of latitude and longitude.

Claim 1 recites a method for determining motion and location parameters of a railroad locomotive wherein the method includes the steps of "providing at least two satellite signal receivers on the locomotive at spaced locations along the length of the locomotive . . . determining a vector distance $\vec{\mathbf{d}}$ between the two satellite signal receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determining a set of phase differences between satellite reference signals received by satellite receivers . . . determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the satellite reference signals and the vector distance $\vec{\mathbf{d}}$."

Neither Bidaud nor Ford, considered alone or in combination describes or suggests, a method for determining motion and location parameters of a railroad locomotive as is recited in Claim 1. Specifically, neither Bidaud nor Ford, considered alone or in combination, describes or suggests determining determining a vector distance $\vec{\mathbf{d}}$ between the two satellite signal receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a process for determining a baseline (vector $\vec{\mathbf{r}}_o$) using carrier observations made at a primary antenna and a secondary antenna, in combination with user-supplied constraints.

Furthermore, at Page 4 of the instant Office Action, Applicants agree with the statement that, "Ford and Bidaud do not disclose the integer ambiguity is resolved by consulting a database that provides for an initial heading and track grade as a function of latitude and longitude."

Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Bidaud in view of Ford.

Claims 5-9 and 12-14 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 5-9 and 12-14 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 5-9 and 12-14 likewise are patentable over Bidaud in view of Ford.

Claim 15 recites an apparatus for determining motion and location parameters of a railroad locomotive to detect curves and reduce track wear, wherein the apparatus includes "at least two phase-locking satellite receivers configured to reference signals received from a set of satellites . . . a processor configured to . . . determine a set of phase differences between the reference signals received by said satellite receivers . . . determine a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determine an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the reference signals and the vector distance $\vec{\mathbf{d}}$."

Neither Bidaud nor Ford, considered alone or in combination, describes or suggests an apparatus for determining motion and location parameters of a railroad locomotive as is recited in Claim 15. Specifically, none of Bidaud, Ford or Gross, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude. Rather, in contrast to the present invention, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, and Ford describes a process for determining a baseline (vector $\vec{\mathbf{r}}_0$) using carrier observations made at a primary antenna and a secondary antenna, in combination with user-supplied constraints.

Furthermore, at Page 4 of the instant Office Action, Applicants agree with the statement that, "Ford and Bidaud do not disclose the integer ambiguity is resolved by consulting a database that provides for an initial heading and track grade as a function of latitude and longitude."

Accordingly, for at least the reasons set forth above, Claim 15 is submitted to be patentable over Bidaud in view of Ford.

Claims 19-23, 28, and 29 depend, directly or indirectly, from independent Claim 15. When the recitations of Claims 19-23, 28, and 29 are considered in combination with the recitations of Claim 15, Applicants submit that Claims 19-23, 28, and 29 likewise are patentable over Bidaud in view of Ford.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1, 5-9, 12-15, 19-23, 28, and 29 be withdrawn.

The rejection of Claims 3, 4, 17, and 18 under 35 U.S.C. § 103(a) as being unpatentable over Bidaud in view of Ford, in view of Gross, as applied to Claims 1, 2, 15, and 16 above, and further in view of U.S. Patent No. 6,313,788 to Wilson (hereinafter referred to as "Wilson") is respectfully traversed.

As discussed above, Gross is excluded as prior art for § 103(a) purposes under § 103(c). Bidaud and Ford are described above.

Wilson describes a method for determining inter-antenna baselines using an antenna configuration (200) that includes a pair of relatively closely-spaced (D1) antennas and other pairs of distant (D2) antennas. The closely-spaced pair (D1) provides a short baseline that has an integer ambiguity that may be searched exhaustively to identify the correct set of integers. Specifically, as recited at Column 8, lines 40-43, "the exact number of cycles of the radio source carrier wave 310 may be used to reliably resolve the integer ambiguity 380 and thereafter determine the baseline." As such, Wilson describes using radio wave cycles to exhaustively search for and identify integer ambiguities. Notably, Wilson does not describe nor suggest determining a vector distance $\vec{\mathbf{d}}$ between two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude.

Claim 1 recites a method for determining motion and location parameters of a railroad locomotive wherein the method includes the steps of "providing at least two satellite signal receivers on the locomotive at spaced locations along the length of the locomotive . . . determining a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude. . . determining a set of phase differences between satellite reference signals received by satellite receivers . . . determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the satellite reference signals and the vector distance ."

No combination of Bidaud, Ford, and Wilson, describes nor suggests a method for determining motion and location parameters of a railroad locomotive, as is recited in Claim 1. Specifically, none of Bidaud, Ford, nor Wilson, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude Rather, in contrast to the recitations of Claim 1, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, Ford describes a process for determining a baseline vector using carrier observations made at a primary antenna and a secondary antenna, in combination with user-supplied constraints, and Wilson describes using radio wave cycles to exhaustively search for and to identify integer ambiguities. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Bidaud in view of Ford, and further in view of Wilson.

Claims 3 and 4 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 3 and 4 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 3 and 4 likewise are patentable over Bidaud in view of Ford, and further in view of Wilson.

Claim 15 recites an apparatus for determining motion and location parameters of a railroad locomotive to detect curves and reduce track wear, wherein the apparatus includes

"at least two phase-locking satellite receivers configured to reference signals received from a set of satellites . . . a processor configured to . . . determine a set of phase differences between the reference signals received by said satellite receivers . . . determine a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determine an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the reference signals and the vector distance ."

No combination of Bidaud, Ford, and Wilson, describes nor suggests an apparatus for determining motion and location parameters of a railroad locomotive as is recited in Claim 15. Specifically, none of Bidaud, Ford, nor Wilson, considered alone or in combination, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude Rather, in contrast to the recitations of Claim 15, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, Ford describes a system that determines a baseline vector using carrier observations made at a primary antenna and a secondary antenna, in combination with user-supplied constraints, and Wilson describes using radio wave cycles to exhaustively search for and to identify integer ambiguities. Accordingly, for at least the reasons set forth above, Claim 15 is submitted to be patentable over Bidaud in view of Ford, and further in view of Wilson.

Claims 17 and 18 depend, directly or indirectly, from independent Claim 15. When the recitations of Claims 17 and 18 are considered in combination with the recitations of Claim 15, Applicants submit that Claims 17 and 18 likewise are patentable over Bidaud in view of Ford, and further in view of Wilson.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 3, 4, 17, and 18 be withdrawn.

The rejection of Claims 10, 11, and 24-27 under 35 U.S.C. § 103(a) as being unpatentable over Bidaud in view of Ford, in view of Gross, as applied to Claims 1, 5, 15, and 19 above, and further in view of U.S. Patent No. 5,896,947 to Kumar (hereinafter referred to as "Kumar") is respectfully traversed.

As discussed above, Gross is excluded as prior art for § 103(a) purposes under § 103(c). Bidaud and Ford are described above.

Kumar describes a method for simultaneously lubricating the rail gage side (RAGS) and wheel flanges ahead of a locomotive's (1) attractive wheels, and lubricating the top of the rail (TOR) behind the tractive wheels to reduce the resistance of the trailing cars and to reduce locomotive wheel flange wear. Kumar describes controlling both lubricating units with the same computer controller (2) when a single locomotive (1) is used, and using two controllers (2F, 2R) located in two different locomotives (1) in the case of a train consist (10). Notably, Kumar does not describe nor suggest determining a vector distance between the two satellite signal receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude.

Claim 1 recites a method for determining motion and location parameters of a railroad locomotive wherein the method includes the steps of "providing at least two satellite signal receivers on the locomotive at spaced locations along the length of the locomotive . . . determining a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determining a set of phase differences between satellite reference signals received by satellite receivers . . . determining an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the satellite reference signals and the vector distance ."

No combination of Bidaud, Ford, and Kumar describes nor suggests a method for determining at least one of motion and location parameters of a railroad locomotive, as is recited in Claim 1. Specifically, no combination of Bidaud, Ford, and Kumar, describes or suggests a method including determining a vector distance $\vec{\mathbf{d}}$ between the two satellite

receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude. Rather, in contrast to the recitations of Claim 1, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, Ford describes a process for determining a baseline vector using carrier observations made at a primary antenna and a secondary antenna, in combination with user-supplied constraints, and Kumar describes a method for simultaneously lubricating the rail gage side and wheel flanges ahead of a locomotive's tractive wheels, and lubricating the top of the rail behind the tractive wheels to reduce the resistance of the trailing cars and reduce the locomotive wheel flange wear. Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Bidaud in view of Ford, and further in view of Kumar.

Claims 10 and 11 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 10 and 11 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 10 and 11 likewise are patentable over Bidaud in view of Ford, and further in view of Kumar.

Claim 15 recites an apparatus for determining motion and location parameters of a railroad locomotive to detect curves and reduce track wear, wherein the apparatus includes "at least two phase-locking satellite receivers configured to reference signals received from a set of satellites . . . a processor configured to . . . determine a set of phase differences between the reference signals received by said satellite receivers . . . determine a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude . . . determine an accurate heading, accurate heading rate, attitude, and attitude rate of the locomotive during normal locomotive transit operation using only the set of phase differences between the reference signals and the vector distance ."

No combination of Bidaud, Ford, and Kumar, describes nor suggests an apparatus for determining motion and location parameters of a railroad locomotive as is recited in Claim 15. Specifically, no combination of Bidaud, Ford, and Kumar, describes nor suggests a

method including determining a vector distance $\vec{\mathbf{d}}$ between the two satellite receivers using an integer ambiguity, wherein an initial integer ambiguity is resolved by consulting a database that provides an initial heading and track grade as a function of latitude and longitude. Rather, in contrast to the recitations of Claim 15, Bidaud describes a track analyzer that uses a gyroscope to determine a grade and an elevation of a track, a curvature of the track, a speed of a vehicle relative to the track, a distance the vehicle has traveled along the track, and the direction in which the vehicle is moving, Ford describes a system that determined a baseline vector using carrier observations made at a primary antenna and a secondary antenna, in combination with user-supplied constraints, and Kumar describes a method for simultaneously lubricating the rail gage side and wheel flanges ahead of a locomotive's tractive wheels, and lubricating the top of the rail behind the tractive wheels to reduce the resistance of the trailing cars and reduce the locomotive wheel flange wear. Accordingly, for at least the reasons set forth above, Claim 15 is submitted to be patentable over Bidaud in view of Ford, and further in view of Kumar.

Claims 24-27 depend, directly or indirectly, from independent Claim 15. When the recitations of Claims 24-27 are considered in combination with the recitations of Claim 15, Applicants submit that Claims 24-27 likewise are patentable over Bidaud in view of Ford, and further in view of Kumar.

For at least the reasons set forth above, Applicants respectfully requests that the Section 103 rejection of Claims 10, 11, and 24-27 be withdrawn.

In view of the foregoing remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,

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